

Compositionality, abstraction and metaphor in some prefix- and particle verbs

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NEW EMPIRICAL AND THEORETICAL PERSPECTIVES ON THE
LITERAL/NON-LITERAL MEANING DIVIDE

Stuttgart, 10th — 11th Oct 2016

1 Introduction

- The presentation focusses on structural properties of verbal constructions and related nominals involving the German particles $\sqrt{\text{an}}$ (on) $\sqrt{\text{ab}}$ (off, down), and $\sqrt{\text{auf}}$ (on) and the prefix $\sqrt{\text{über}}$ (over) on the one hand, and verbal kernels contributing forces i.e. $\sqrt{\text{heb}}$, (heave), $\sqrt{\text{rühr}}$ (stir), $\sqrt{\text{zieh}}$ (pull), $\sqrt{\text{spann}}$ (tens(inon)), and others.
- Our Formal Semantics approach to the compositional analysis of the semantics of particle verbs constructs such verbs syntactically and semantically from the roots of particle or prefix and verb. The syntax assumes principles of Minimalist Syntax (as in *Distributive Morphology* (cf. Halle and Marantz [1993])). The semantics assumes principles of *Discourse Representation Theory* (DRT), (cf. Roßdeutscher and Kamp [2010], Rossdeutscher [2013], Rossdeutscher [2015], Pross and Roßdeutscher [2015], i.a.)
- One question that has occupied us for some time is as follows: How is it possible that a handful of prepositional forms and a handful of verbal kernels can cover such a wide range of the expressive needs, extending over a number of different domains, among them spatial relations, scalar relations, causal relations and static and dynamic configurations of force with causal implications?
- Recently we have been pursuing the idea that the base function of both categories, the root of the mentioned particles and prefix and the force contributing verbal kernels, is its description of eventualities situated in Primary Perceptual Space. The roots can also occur as constituents of descriptions of properties, but properties that apply to 'shifted', 'abstract' domains (and not to concrete domain of space and motion).
- The analyses in this presentation do not challenge this intuition, at least not necessarily so. However, the application of our compositional principles and tools reveals some unexpected linguistic regularities that suggest that 'abstraction' has an impact not only on the semantics of expressions, but also on their grammar.
- Our observation is very simple: when verbal constructions built from the mentioned parts express abstract content they are constructed bi-eventively, whereas those that describe eventualities in PPS are mono-eventive.
- Recall that bi-eventive verbs in German have *ung*-nouns; mono-eventive don't. (c.f Roßdeutscher and Kamp [2010], Roßdeutscher [2010], i.a.)

1.1 Introductory examples

- the examples (1) speak of change of location of a theme in PPS

- (1) a. *die Hebung der Kiste
Hans hob eine Kiste
Hans heaved a box
- b. *die Anhebung der Kiste
Hans hob eine Kiste an
Hans heaved a box

c. *die Aufhebung der Karte
Hans hob eine Karte auf
 Hans heaved a playing-card auf.PRTC
 Hans took a playing-card (from the staple)

d. *die Abhebung der Karte
Hans hob eine Karte ab
 Hans heaved a playing-card ab.PRTC
 Hans took a playing-card (off the staple)

- the examples (2) speak of abstract state of affairs or changes of properties of the theme

(2) a. die Hebung der Stimme
der Lehrer hob die Stimme
 the teacher heaved the voice
 'the teacher spoke up

b. die Anhebung der Stimme
der Lehrer hob die Stimme an
 the teacher heaved the voice an.PRTC
 'the teacher spoke up a bit

c. die Hebung der Preise
die Bahn hob die Preise
 the rail-way heaved the prizes
 'the railway raised the charges'

- the rule is widespread and ranges over various particles and verbal kernels. An open list is displayed in Table 1. There will be more examples below.

<i>ein gespanntes / ein angespannter Seil / ein aufgespannter Schirm</i> (the tightened rope) (unfolded umbrella) (≠ Spannung des Seils, *Anspannung des Seils, *Aufspannung des Schirms)	<i>das gespannte Auditorium</i> , (excited audience), <i>die Spannung des Auditoriums</i>
<i>die Suppe rühren</i> (stir the soup) * <i>Rührung der Suppe</i>	<i>das Publikum rühren / anrühren</i> (touch the audience) <i>Rührung / Anrührung des Publikums</i>
<i>Schafe auf die Weide treiben</i> (chase sheep on the ground) (* <i>Treibung der Schafe...</i> ; <i>Boot trieb vom Kurs ab</i> (boat drive off the course), * <i>Abtreibung vom Kurs</i>)	<i>einen Foetus abtreiben</i> (abort a foetus) <i>Abtreibung des Foetus</i>
<i>ein Auto anschieben</i> (to start moving a car), * <i>Anschiebung</i>	<i>Reformen anschieben</i> (to start reforms) <i>Anschiebung von Reformen</i>

Table 1

- As a first shot for the contribution of $\sqrt{\text{an}}$, $\sqrt{\text{auf}}$ on the one hand and $\sqrt{\text{heb}}$ on the other, in (2), the contribution of $\sqrt{\text{heb}}$ is 'high' or 'higher' in some sense. That's the common core to the contributions of $\sqrt{\text{heb}}$ in the descriptions of state of of affairs in PPS in (1).
- Because of this common core $\sqrt{\text{heb}}$ and $\sqrt{\text{an}}$ or $\sqrt{\text{auf}}$ combine in (1) as well as in (2). In both patterns $\sqrt{\text{an}}$ and $\sqrt{\text{auf}}$ also seem to contribute 'the increase of something' (as opposed to the 'decrease of something').

- One the aims of this presentation is to give formal and conceptual substance to 'this something'.
- As for $\sqrt{\text{heb}}$ it is instructive to look at participles. Surprisingly those participles have the formal characteristics of adjectival roots, such as $\sqrt{\text{feucht}}$ or $\sqrt{\text{schmutz(ig)}}$.

- (3) a. *gehobene Preise*
 POS.PRTCP.heb.v prizes
 'be of high prize category'
- b. *gehobenere Preise / gehobenere Ansprüche*
 COMP.PRTCP.heb.v prizes / demands
 'be of upper prize category' / 'more ambitious demands'
- c. (*für*) *gehobenste Ansprüche*
 (for) SUPERL.PRTCP.heb.v prizes
 '(for) most ambitious demands'

- (4) a. *Preise anheben* (5) a. *ein Handtuch anschmutzen*
 prizes an.PRTC.heb.v a towel an.PRTC.dirty.v
 'raise prizes' 'make a towel dirty'
- b. **Preise aufheben* b. **ein Handtuch aufschmutzen*
 prizes auf.PRTC.heb.v a towel auf.PRTC.dirty.v

- Our formal reconstruction will show that the contribution of $\sqrt{\text{heb}}$ in (2) is to introduce a property-predicate; the predicate is true of a thing as soon as the thing has the property to some minimal degree, — just like a towel is dirty as soon as it has some dirt on. (N.B. This analysis predicts that when $\sqrt{\text{heb}}$ is used in a construction that is interpreted in the sense of raising the prizes it can combine with *an*, but not with *auf* or $\sqrt{\text{über}}$ (for the same general reasons as for, say, **aufschmutzen* or **auffeuchten* or **überschmutzen* are ungrammatical.))
- Two things relevant to the aim of this workshop that we can learn from this analysis:
 - we would not want to call the verbs (2) and the particles in (3) 'non-literal';
 - nevertheless, it seems right to see a meaning shift between 'literal contributions' of the occurrences of the root $\sqrt{\text{heb}}$ and the contribution that $\sqrt{\text{heb}}$ makes in (2) and (1).

1.2 Out-liers

- (6a) exemplifies constructions built from $\sqrt{\text{auf}}$ and $\sqrt{\text{heb}}$ in which $\sqrt{\text{heb}}$ also makes shifted contributions; here the combination of $\sqrt{\text{auf}}$ and $\sqrt{\text{heb}}$ leads to a bi-eventive eventuality description; in contrast with the mono-eventive description (1). In this regard the particle constructions in (6a) are like the prefix-constructions with $\sqrt{\text{er}}$ in (6b).

- (6) a. Die Aufhebung eines Gesetzes
ein Gesetz / eine Sperre / Steuern / einen Vertrag / Preise aufheben
 a law / a ban / taxes / a contract / prizes auf.PRTC.heave
 'to cancel a law / ban / release taxes / cancel prizes / cancel a contract'
- b. *etwas zum Gesetz erheben / Steuern / Preise erheben*
 something for a law prizes er.PRFX.heave
 to install a law / raise taxes / charge for s.th.

- This difference between the constructions in (6) and (1) leads to the question: What if anything do the occurrences of $\sqrt{\text{heb}}$ in (6) and (1) have in common?
- The examples in (6) almost cover the very small niche of constructions that behave alike. Other instances where $\sqrt{\text{auf}}$ arguably has the same contribution are special juristic expressions such as *ein Grundstück auflassen* (to abandon possession of a piece of land) or rare and old-fashioned expressions such as *jemanden die Freundschaft aufkündigen* (to terminate one's friendship with somebody). We conjecture that the eventuality of the constructions in (6a) is an effect of a force-dynamic component associated with $\sqrt{\text{heb}}$. (This component is most clearly recognised in in the Swabian use of *heben*, which corresponds to high German *halten* (to hold)).
- The particle constructions with *auf* are antonymous to prefix-constructions with *er*. Both the constructions evoke the force-dynamic contribution of $\sqrt{\text{auf}}$, the construction is as figurative as the idiomatic constructions *etwas in Kraft setzen* (lit: to put s.th. into force) and *außer Kraft setzen* (lit: to put s.th. out of force).
- a related outlier is (7). An analysis is displayed towards the end of the paper.

- (7) Hebung eines Wracks
ein Wrack heben
 a wrack heb.v
 to salve a wrack

- An outlier of an 'alien kind' is *Essen aufheben*

- (8) *Essen aufheben / gut aufgehoben sein*
 food auf.PRTCL.heb / well up.PRTCPL.heb.de
 'keep food', 'to be well cared for'

- this construction is a lonely item without obvious kin or pattern. It is unclear, whether there is a connection to the idea of counterforce against natural decay, or to that or lifting something out of an area of potential harm.
- The meaning shift in roots that we assume leads from the contribution of $\sqrt{\text{heb}}$ in (1) to its contributions in (2) must be distinguished from figurative uses of complete verb phrases like that in (9). The contribution that $\sqrt{\text{über}}$ and $\sqrt{\text{spann}}$ make to the meaning of *überspannen*) when combined with the direct object *den Bogen* are the same whether the Phrase *den Bogen überspannen* as a whole is used to describe an event of drawing an actual bow or 'figuratively' an event in which too pressure is exerted on something (e.g. your own stamina) that 'snaps' (i.e. gets destroyed or harmed because the pressure exerted is too much.)

- Note that the language we have used to describe the figurative use involves what are figurative uses of forces, e.g. the use of pressure on someone's stamina. It seems virtually impossible to get away from this.

- (9) *Überspannung des Bogens
den Bogen überspannen
 the violin bow
 'to overbend a violin bow'

2 Analysis at the syntax-semantics interface

- The structures presented are sometimes simplifications and 'short cuts' of the complete structures that contain all that is relevant for present purposes. ¹
- Other structural descriptions have the status of 'first drafts' and will have to be refined as research goes on. As structural descriptions of force-verbs are a highly delicate matter this cannot be avoided.
- Architecture in a nutshell: roots enter the structure combining with functional heads that license in particular ontological categories, e.g.
 - v(erbaler) → events;
 - voice → (proto)-agents;
 - P_{lex} → spatial regions; Path → spatial paths;
 - P_{funct} (over P_{lex}) → states
 - a(adjective) → properties;
 - n(oun) → entities; f(orce) → forces
 - scale → (non-spatial) scales, i.e., ordered sets of degrees

2.1 Evidence for a building block of forces

- forces are ontological categories that belong to natural language metaphysics. In some constructions modifiers refer to forces directly. in (10) the measure phrase applies to the maximal force that the magnet is able to exert.

- (10) *Der Elektromagnet könnte also etwa 26,1 Newton heben. Das entspricht ca.*
 the e-magnet could ca. 26,1 Newton lift.
 2,7kg

'The e-magnet is able to lift 24,1 Newton. That is equivalent to 2,7 kg'

- A couple of adverbs are used to specify the magnitude of the force; but particular modifiers go only with particular force-kernels (cf. 11)

- (11) a. fest (firm) / #hart (hard) / #schwer (heavy) ziehen (pull) / spannen (tighten)
 b. #fest / # hart / schwer heben (heave, lift)
 c. fest / # hart / schwer schieben (push)
 d. fest / hart / schwer schlagen (schlagen)

¹For recent developments of the theory of *-ung*-nominalisations, see (Pross [2013], Pross [2016])

2.2 Analyses of the construction at the syntax-semantics-interface

- Among the mono-eventive constructions we do not expect the verbal kernel to be properly represented as a discourse referent that is directly accessible for modification, as seems to be the case in (10).

2.2.1 Mono-eventive constructions

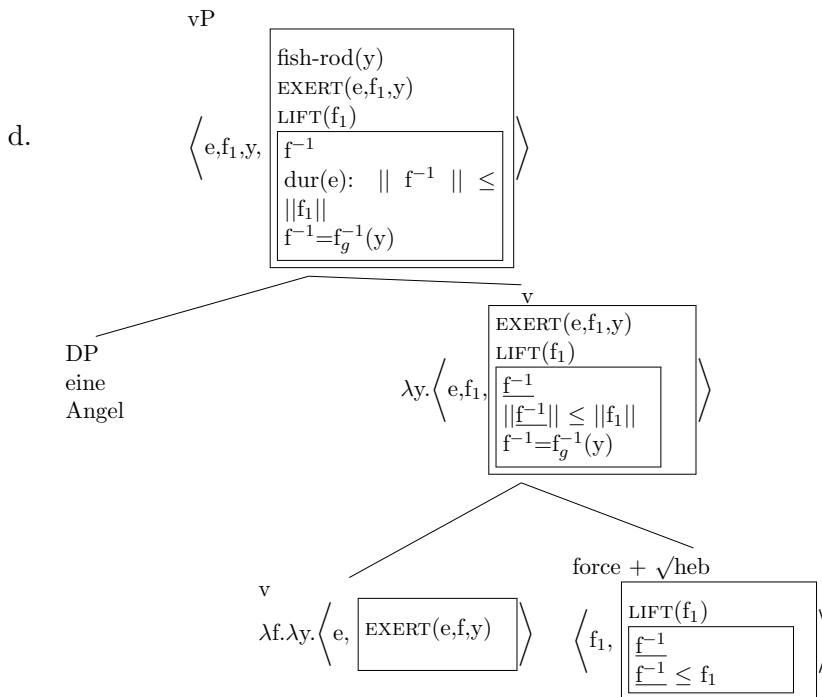
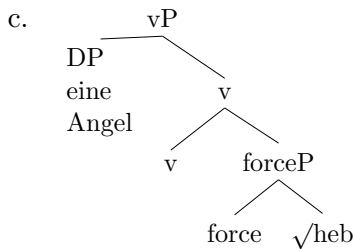
(12)

Swabian *heben*

a. *stundenlang eine Angel heben*
 hourslong a fishing-rod hold

'to hold up a fishing-rod for hours'

b. # *stundenlang eine Angel aufheben*



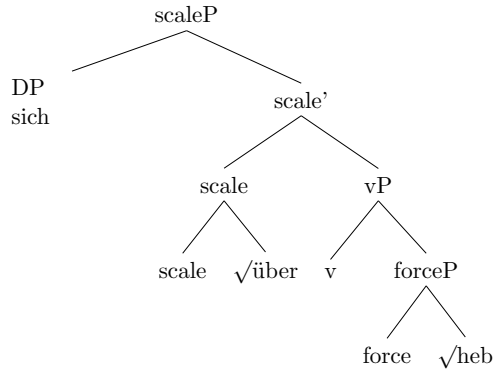
- the root $\sqrt{\text{heb}}$ has a force dynamic meaning component. Its contribution in this construction is providing counterforce against gravity acting on the 'agonist' (cf. Talmy [1988]). Here the 'agonist' is the fishing-rod. The sentence describes a force-dynamically stable situation, a 'steady state' situation in the sense of Talmy, where gravity acting on the rod and the $\sqrt{\text{heb}}$ -force are balanced.
- A possible refinement of the representation in (12d) would bring in the counterfactual aspects of the equilibrium between forces: if the force introduced by the root $\sqrt{\text{heb}}$ weren't there, or were significant less than it is, than the other forces involved in the equilibrium would have produced their 'default'-effect. In other words: if the $\sqrt{\text{heb}}$ -force had been absent or weaker, gravity would have caused the theme (described by the direct object *eine Angel* (a fishing rod) to move in the direction in which is pulled (typically, would case it to fall). Crucially, the semantics of Swabian *heben*

or high German *halten* is not reducible to the non-occurrence of the falling event. The falling event is prevented. This aspect of the verbal kernel is referred to in the condition ' $\|f^{-1}\| \leq \|f_1\|$ ' saying that the magnitude of the 'lifting force' outranks the magnitude of gravity. By representing forces and their 'net-effects' in DRSs we try to account for this force-dynamic meaning component. (cf. Zwarts [2010], Copley and Harley [2014], Goldschmidt and Zwarts [2016]).

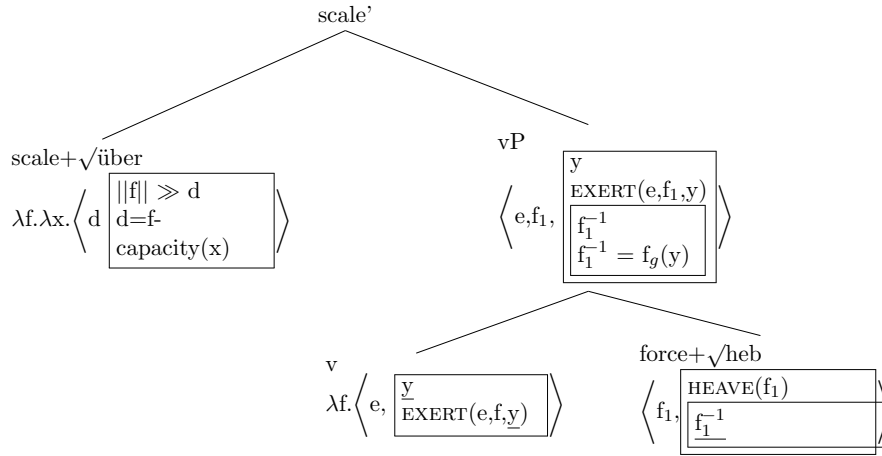
- (13) a. *sich überheben* (mit / an einer Kiste)
REFL over.PREFIX.heb.v (with / from a box)

'to harm oneself by heaving too much weight'

b.

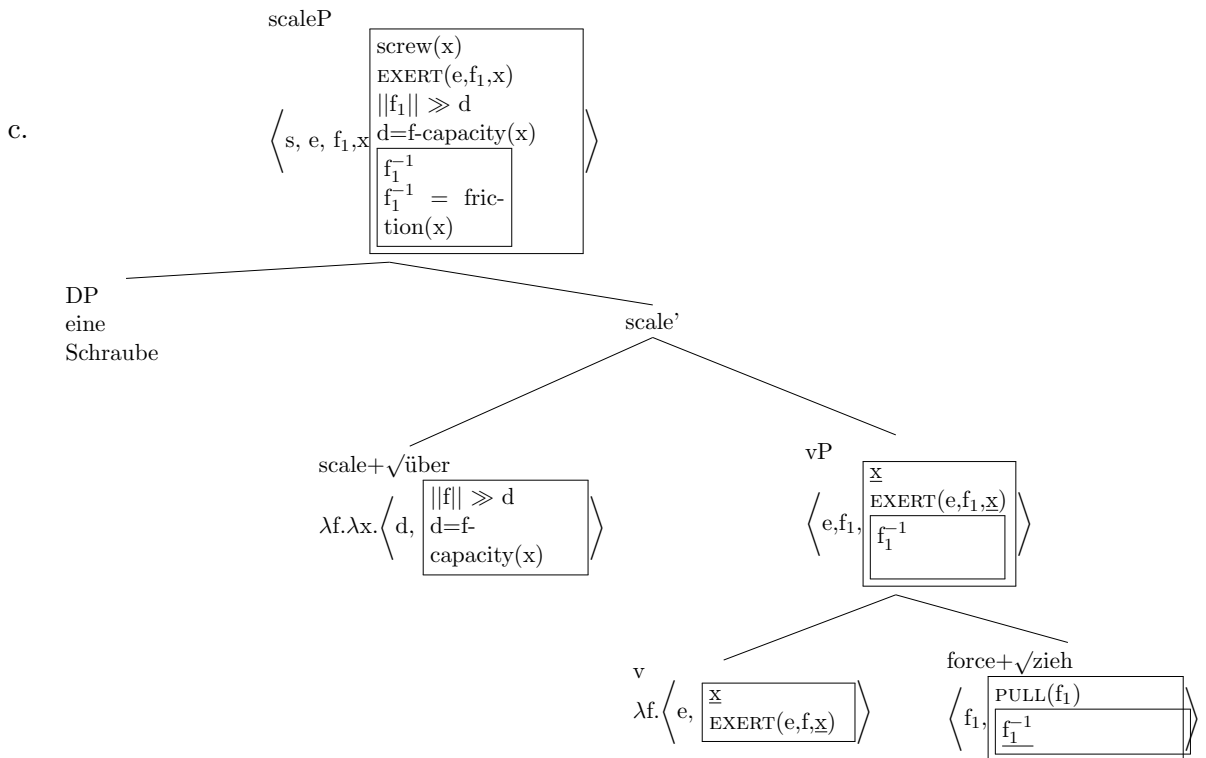
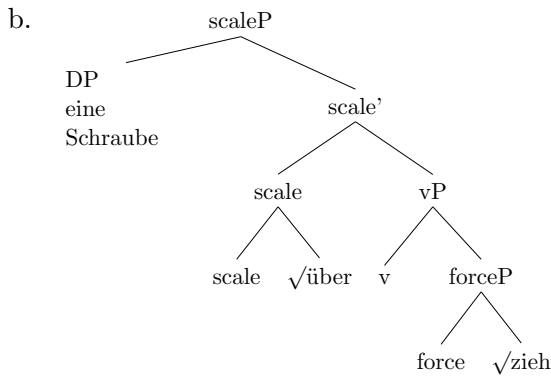


c.



- **Observation:** If the prefix $\sqrt{\text{über}}$ 'measures out' the applied force, the construction is mono-eventive. This is accordance with our observation in the introduction.
- Evidence for the observation are similar constructions such as *eine Schraube überziehen*, (to overwind a screw) *den Bogen überspannen* (to overbend an bow) , *ein Seil überspannen* (to over-tighten a rope). The constructions differ from *sich überheben* in the fact that we have an explicit force-recipient instead of an implicit one. The degree d that becomes exceeded during the force application is the a passive capacity of the srew, the bow, the rope, respectively. (cf. (14)).
- As mentioned in the introduction, there is an idiomatic figurative meaning of *einen Bogen überspannen* (compare (9)).
- the same figurative meaning is contributed by participles that are predicated over things that are conceptualised as recipient of too much force or strain. (15a) speaks of expectation whose realisation is impossible; (15c) of a person who suffers from the damaging effects of too much strain.
- Note that (15b) is constructed bi-eventively. Here, the root $\sqrt{\text{zieh}}$ contributes an abstract property.
- (15b) must be told apart from figurative uses of *sich überheben* where the 'recipient of force' is of an abstract sort, e.g. in *sich mit einem Projekt überheben* (lit: overlift oneself with a project). The figurative reading exploits the scalar structure and the force denoting part of the predication. The non-literal meaning exploits the literal meaning by way of evoking the scene described by the literal meaning.

- (14) a. *eine Schraube überziehen*
 a screw over.PREFIX.pull.v
 'overwind a screw'



- (15) a. *eine überzogene Erwartung / ein überzogenes Tempo*
 a over.PRTCPL.zieh.v expectation / an over.PRTCPL.zieh.v speed
 'an overloaded expectation' / 'a too high speed'

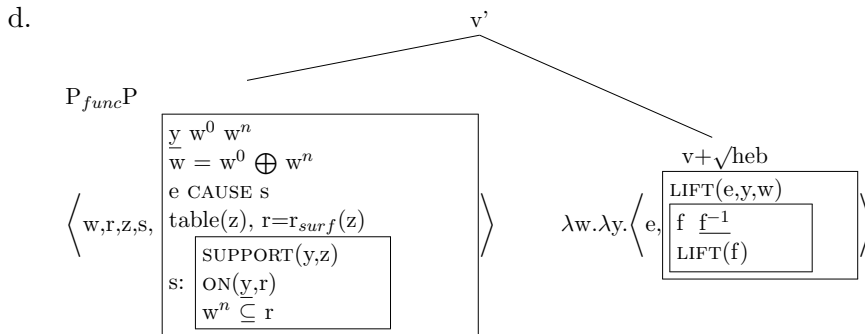
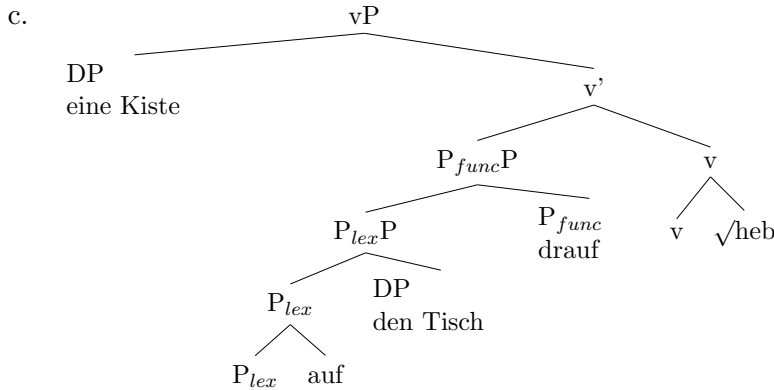
- b. *ein überzogenes Konto*
 an over.PRTCPL.zieh.v bank-account
 'an overdrawn account'

- c. *überspannter Mensch*
 over.PRTCPL.bend.v person
 'person with bad nerves'

2.2.2 Change of location descriptions

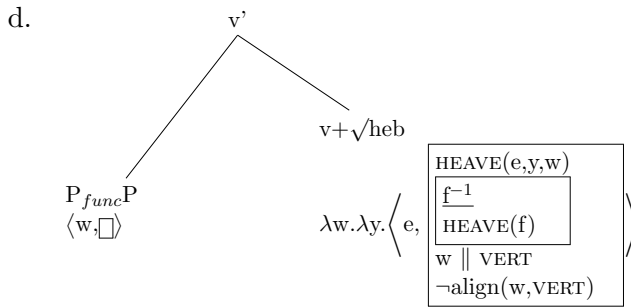
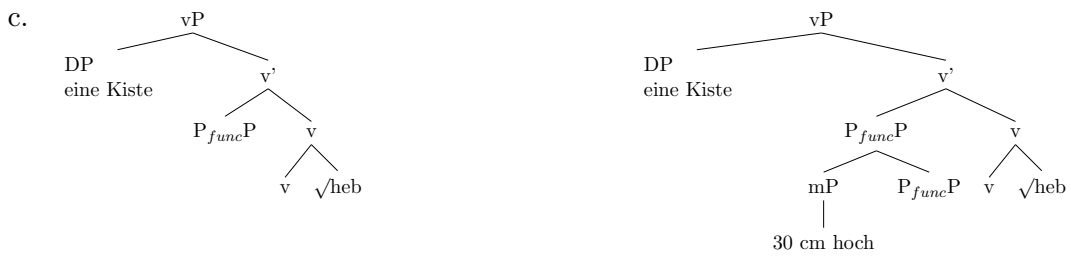
- For a recent theory of prepositional elements at the interface see (Haselbach [2016]).

- (16) a. *eine Kiste (auf den Tisch (drauf)) heben*
 a box (on the table) (dr.DEIX.on.) lift
 'to put a box onto a table
- b. *eine Kiste *leicht / *stark / *schwer auf den Tisch (drauf) heben*



- $P_{func}P$ is a 'full' functional P-Phrase that selects the lexical P-phrase $P_{lex}P$.
- The construction (16d) describes an instantaneous change of the theme from non-support to support by the table, — conceptualised as a result of lifting it. The contribution of $\sqrt{\text{heb}}$ comes to naming an event property, traditionally referred to as 'manner of motion'. (Levin [1993]). There is still a commitment to some 'lift'-force f and its counter-force f^{-1} , the latter gravity acting upon the theme. (Gravity acts upon the box also during the 'heaving' event);
- However, the force discourse referent isn't accessible for modification by the adverb *schwer* (heavily) or others that are measuring the magnitude of the force. This is accounted for in the DRS, in that the force f discourse referent is inaccessible. (N.B. The relation 'support' introduced by the preposition *auf* also involves a force-dynamic relation. The net-force situation during the resultant state is balanced, this is what the relation 'support' comes to.) (The fact that during the lifting event e the LEFT-force balances the gravity-force acting on the theme as well doesn't interfere with the support-relation during in the resultant state. To put it briefly: the 'supporter of the box' changes from Hans to the table.)

- (17) a. eine Kiste heben
 b. eine Kiste 30cm hoch / # 30 cm weit heben



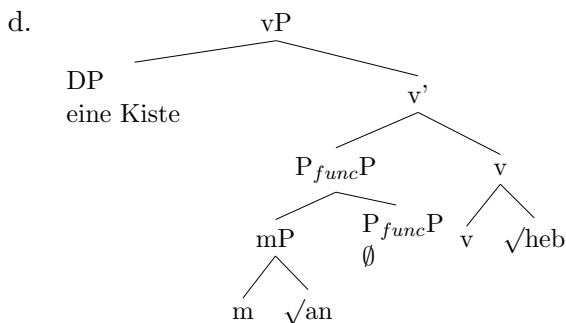
- the root $\sqrt{\text{heb}}$ combines with v to the effect to form a motion verb that commits motion along a path w that follows the vertical dimension in PPS. The head v combined with the root $\sqrt{\text{heb}}$ semantically expresses a figure-path-relation in the sense of Beavers [2012]; $v+\sqrt{\text{heb}}$ licenses prepositional phrases that introduces the path w . Measure phrases measure the length of the path w along the dimension of the vertical in PPS.

- (18) a. *eine Kiste anheben* / *30 cm hoch anheben*
 a box an.PRTC.heb / 30 cm high an.PRTC.heb

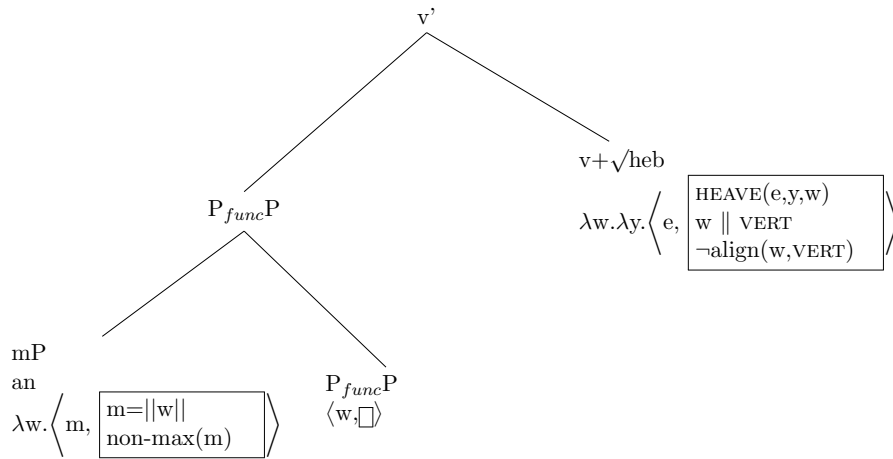
'lift a box' 'lift a box about 30 cm'

- b. eine Kiste (?) 30 cm hoch aufheben / ein Papier (??) drei Zentimeter (hoch) aufheben

- c. * eine Kiste auf den Tisch aufheben



e.



- the same head $\sqrt{v}+\sqrt{\text{heb}}$ licenses the P-structure of *anheben* (to lift a bit).
- (18a) is o.k. because the measure in terms of centi-meters can be adjoined; (18b) is infelicitous because the length is predicated as maximal (so an additional measure phrase seems pragmatically out of place).
- a construction can license only one P_{func} (either with 'full' $P_{func} \gg P_{lex}$ or P_{func} (which does not select any P_{lex})).
- (18c) is out, because two functional projections P_{func} are licensed. This is a violation of what had been called 'theta-criterion' in earlier days.
- there is a reconstruction of the contribution of *an* in *anheben* that fits better into the pattern with *das Seil anspannen*, *das Seil anziehen* (to tighten a rope); *die Bremse anziehen* (to pull the brakes), *eine Taste anschlagen* (to hit a key) where $\sqrt{\text{an}}$ combines with the scale head and the scaleP measures the magnitude of the force. There are two salient interpretation strategies if the hearer follows conceptualisation along the line of 'force measurement', — at least with *anspannen* and *anziehen*: (a) the magnitude of the exertion of the force is non-maximal; (b) the magnitude of the force is as intended.

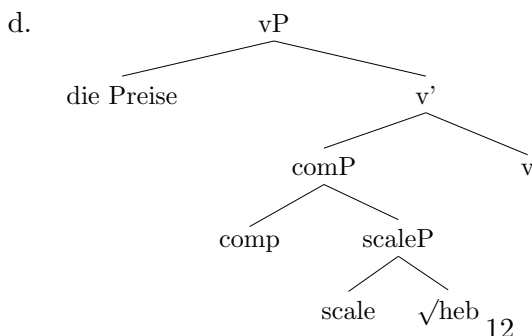
2.3 Bi-eventive constructions

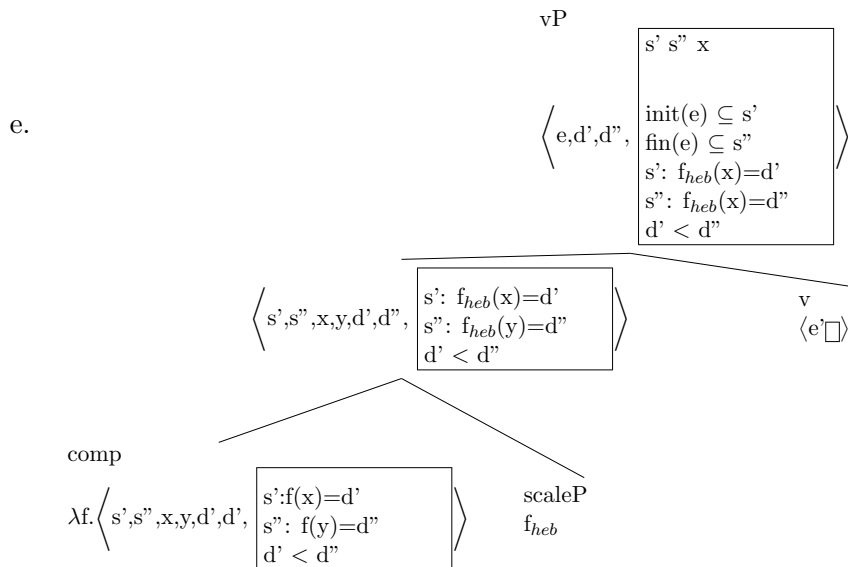
(19) a. Hebung der Preise

die Preise / Standards / Ansprüche heben
 the prizes / standards / demands heb.v
 'to raise the prizes / standards / demands'

b. *gehobene Preise*
 PRTCPL.hev.v prizes
 'prizes of the upper category'

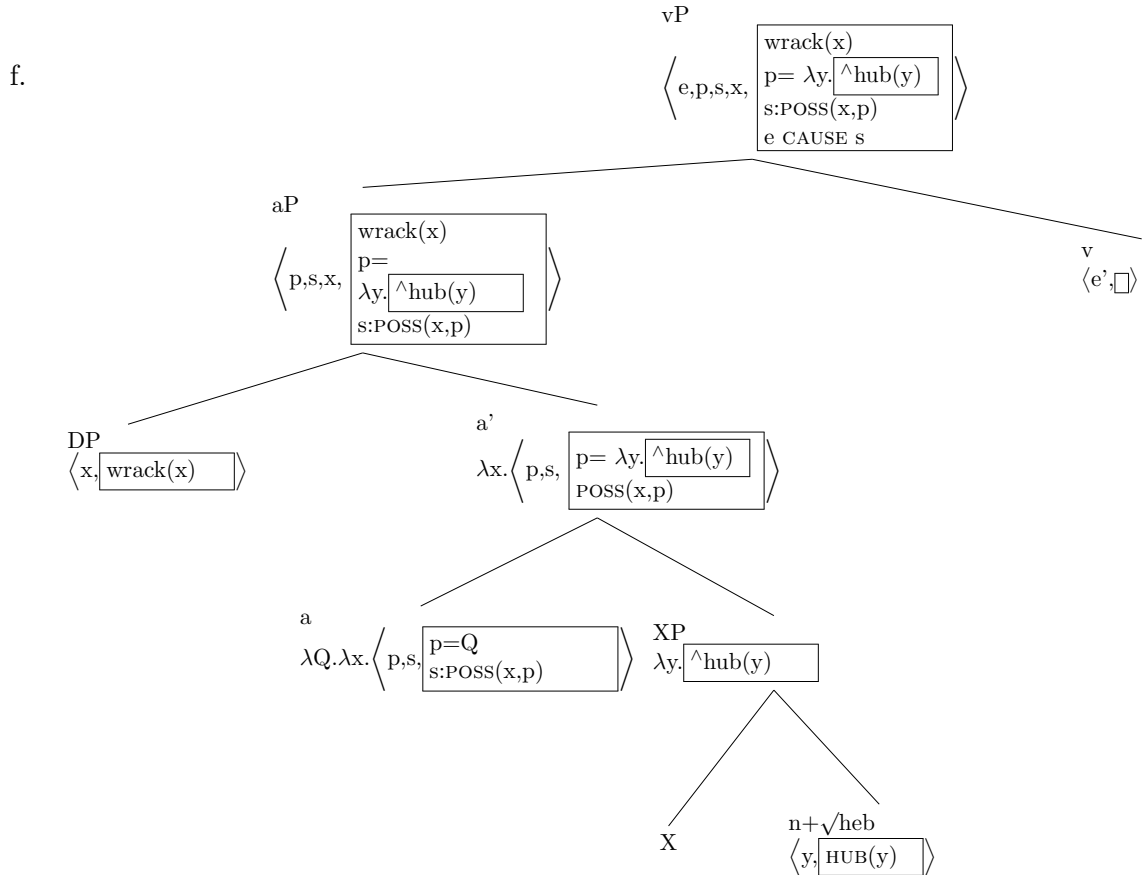
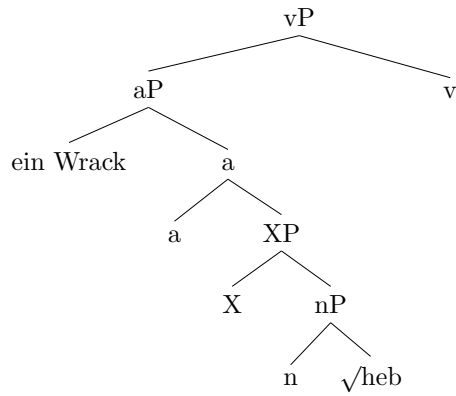
c. **schwach gehobene Preise*
 weakly PRTCPL.hev.v prizes





- the participle in *die gehobenen Preise* is a 'positive' form of the predicate 'gehoben': the prizes, the standards, the demands, are higher than a value of comparison in context. Formally its contribution is to introduce a 'measure function' f_{heb} in the sense of Kennedy and Levin [2008]. (cf. Rossdeutscher [2016]).
- *die Preise heben* means: at s^0 die prizes have the value d' and at s'' the value d'' .
- Predictions: 'measure of distance'-phrases are accepted, e.g. as in *die Preise um drei Euro geben / anheben* (to raise the prizes about 3 Euros).
- the root $\sqrt{\text{heb}}$ functions like an adjectival root. It selects an increasing scale.
- the gradable adjective *gespannt* with the comparative and superlative can be predicated on Persons under psychological tension, only; see *ich bin gespannter als du* (I am more curious than you are), *ich bin die gespannteste (Person) unter euch*; **mein Bogen ist gespannter als deiner* is ungrammatical; here the participle denotes an event property of the bow; there had been a bending event of the bow.
- the 'derived' 'heb'-property is of the partial type, like *schmutzig, feucht*; the predicate combines with *an*, like in *ein Handtuch anschmutzen, ein Handtuch anfeuchten*, but not with *auf*, s. **das Handtuch aufschmutzen, *die Preise aufheben, die Preise überheben*. Conceptually every small increase of the prize is an instance of *heben*. This makes *die Preise heben* telic. *auf-* as a scale modifier can only combine with predicates that have 'bottom- and top-open' scales, like for instance *warm*. (cf. Rossdeutscher [2016] for detailed discussion.)

- (20) a. Hebung eines Wracks
ein Wrack / einen Schatz heben
 a wrack / a treasure heave
 'to salvage a wrack'
- b. ein gehobenes Wrack 'high participle', event properties
- c. #schwach #leicht gehobenes Wrack; ein Wrack # leicht,... heben
- d. # angehobenes Wrack ≠ gehobenes Wrack
- e. simplified



- *ein Wrack heben* is semantically not reducible to lifting a wrack from the bottom of the sea to its surface. The description involves the 'salvage' of the wrack (compare translation). This means that conceptually the property of being safe (against natural or human enemies) is evoked by the description. Arguably, acting against counter-forces is exploited in the semantics of the construction. But neither a force nor a gradable property as in the constructions of the type (19) is accessible. The property that enters the construction is an abstract intensional property; the theme of construction bears this intensional property in the resultant state.
- Note that the syntax node X and the a(djectival) node are well motivated structural elements in the reconstruction: there is a kin-construction with the prefix *be-* (cf. (21). In this construction the prefix is the locus of deriving the participle *behoben*. (cf. Pross [2016]). It's semantically next kin is (*ein Gesetz aufheben*) The construction speaks of mending or redoing a damage. The latter constructions are best understood as metaphorical.

(21)

die Behebung des Schadens

den Schaden beheben

the damage be.PREFIX.heb.v

'to mend a damage'

Summary

The different structures we attribute to these and other prefix and particle verbs, and to larger phrases containing those verbs, enable us to distinguish between the following types of 'non-literal' use:

1. 'non-literal' uses that involve meaning shifts of verbal and/or prepositional roots, but no change in structure (*eine überzogene Erwartung*)
2. 'non-literal' uses that involve structures that differ from those of the 'literal' use (e.g. *ein überzogenes Konto*,)
3. 'figurative' uses, which involve neither meaning shifts of roots nor structural changes but represent the described events as if they were bearers of the properties brought into play by the literal interpretation. (e.g. *sich an einem Projekt überheben*)

Outlook

What can we learn from our analyses for the general goals of the workshop? The general approach adopted in B4 focuses on the interaction between

- the rigidity of structural-syntactic patterns and templates
- the flexibility of the non-structural contribution of roots

The different types of meaning addressed in this workshop emerge as different ways to establish an economic balance between expressive power for the speaker and reconstructability of meaning for the interpreter.

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